Smart Vision Systems Laboratory (SVSL)

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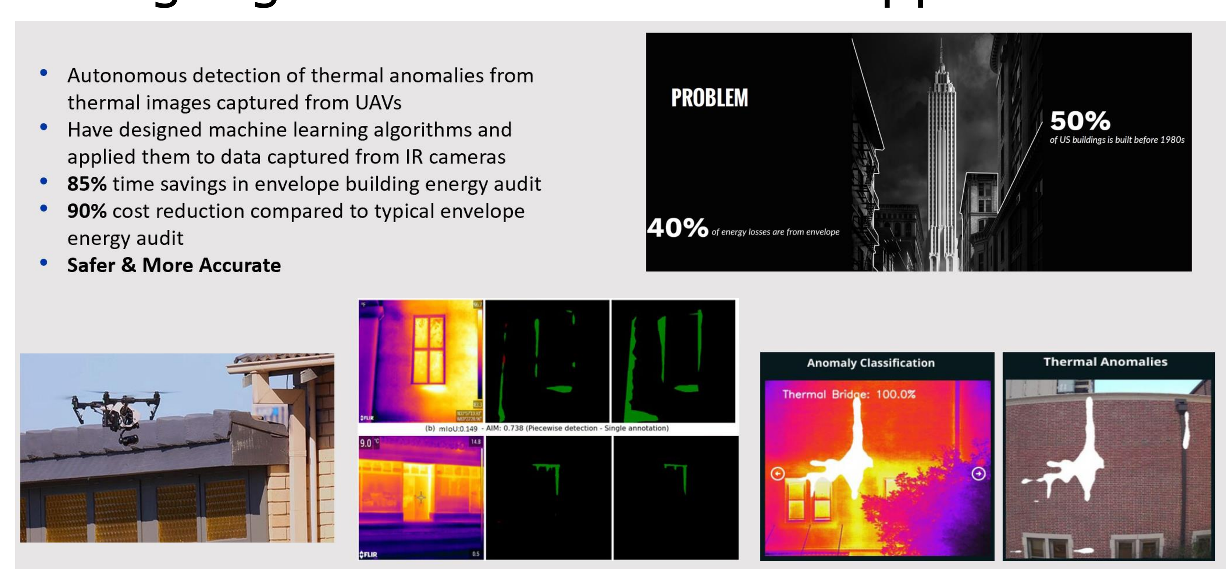
Mission/Purpose

- ❑ To develop advanced machine learning algorithms, and apply them to real-world data captured for different applications from a variety of sensors, including but not limited to visible-range and thermal cameras, microphones, accelerometers and fNIRS devices
- ❑ To collaborate across disciplines and work with researchers in academia and industry to address real-world problems
- ❑ To train students to become next generation engineers and scientists in the rapidly expanding areas of machine learning, embedded systems and computer vision

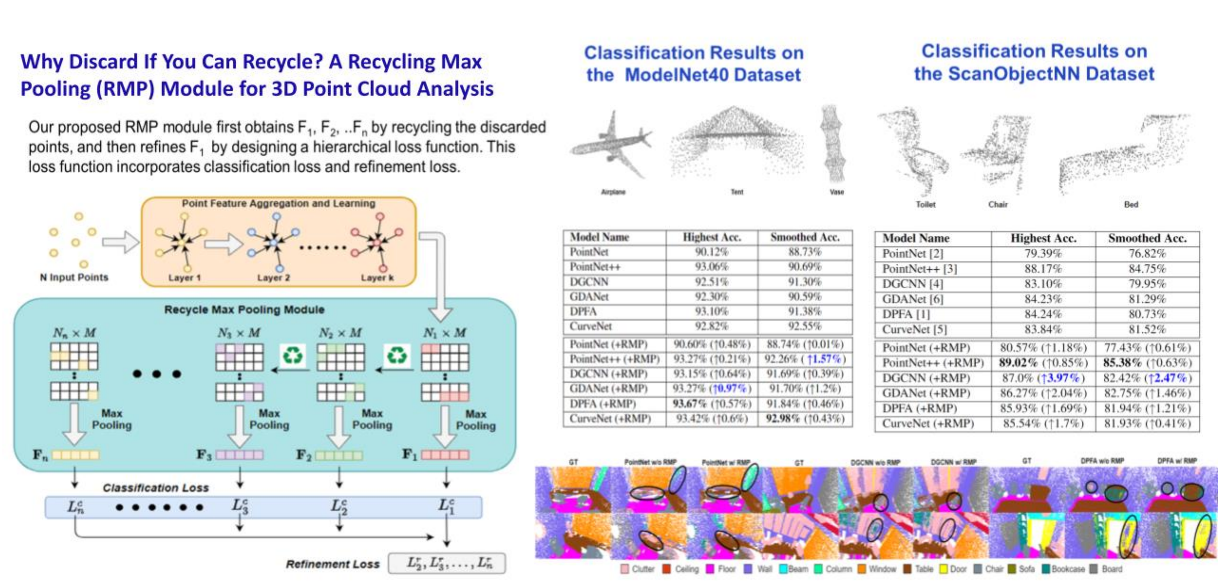
Scope/Current Research

The research conducted in the SVSL is mainly focused on computer vision, mobile cameras and designing advanced machine learning algorithms for different applications

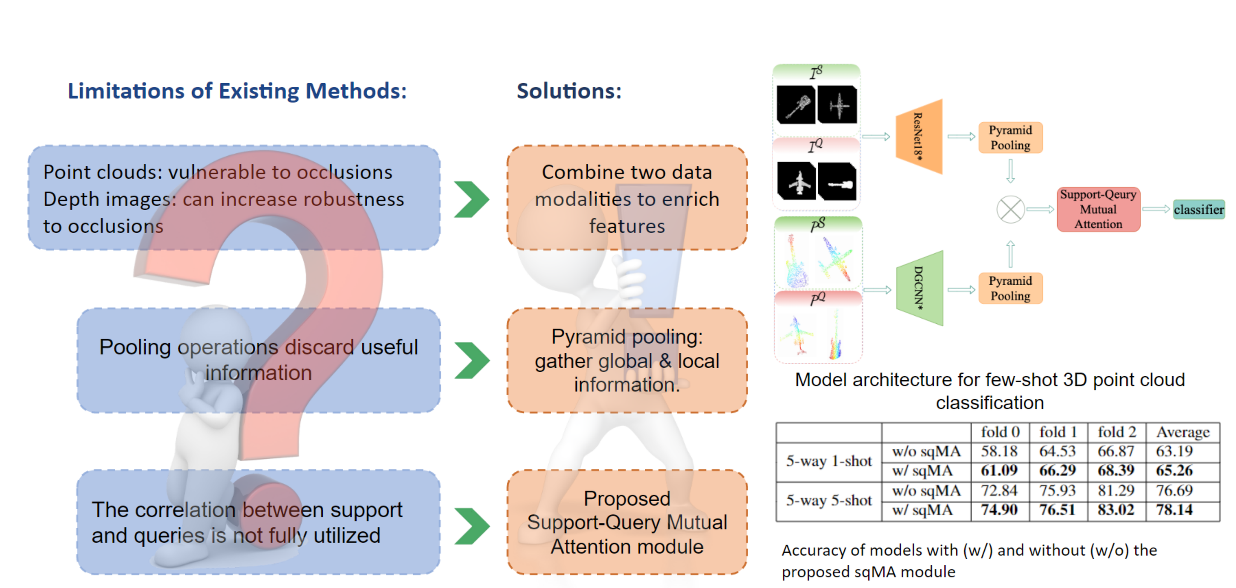
MicroCam: A Low-Power and Privacy Preserving Multi-modal Sensor Platform for Occupancy Detection for HVAC Control and Surveillance



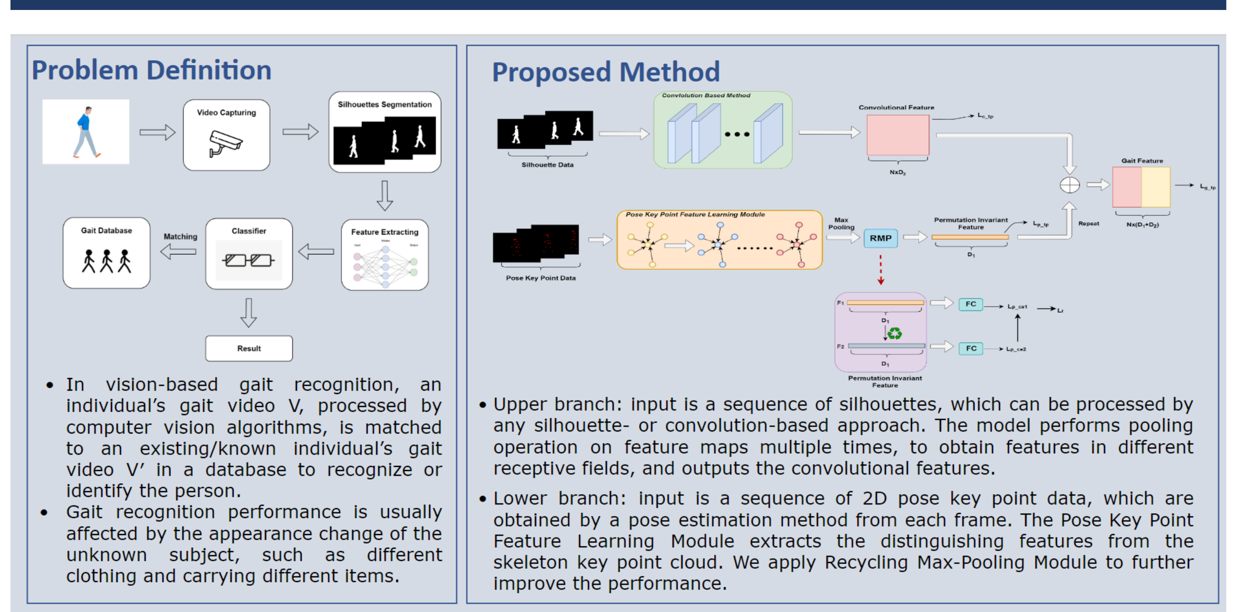
Aerial Building Inspection with UAVs equipped by Infrared Cameras



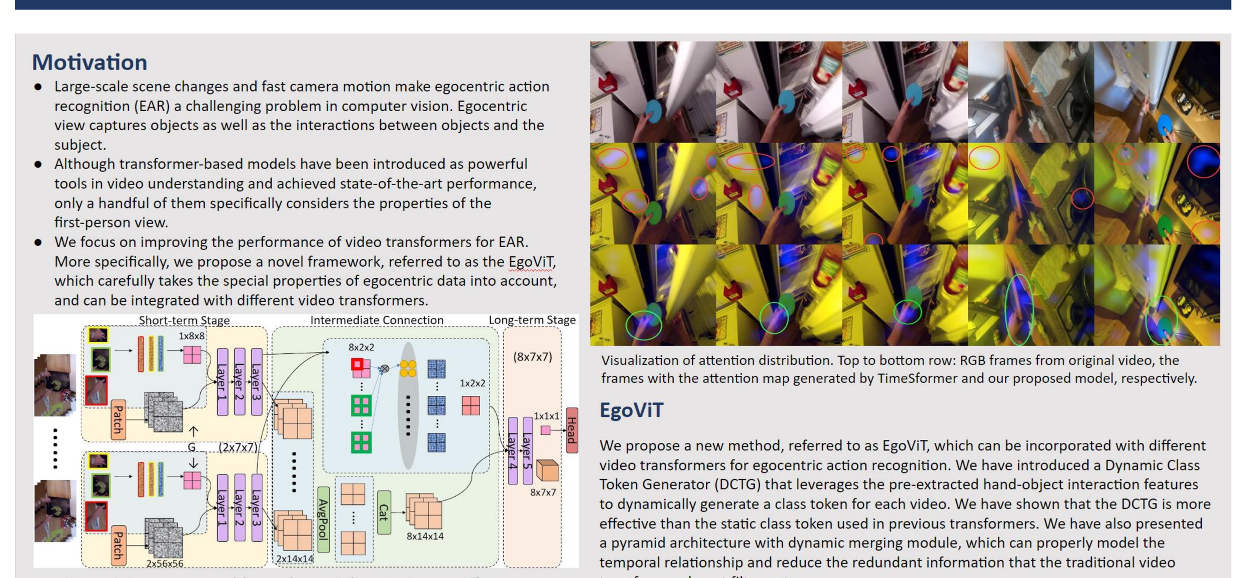
Point Cloud Classification and Segmentation



Cross-Modality Few-Shot Point Cloud Classification

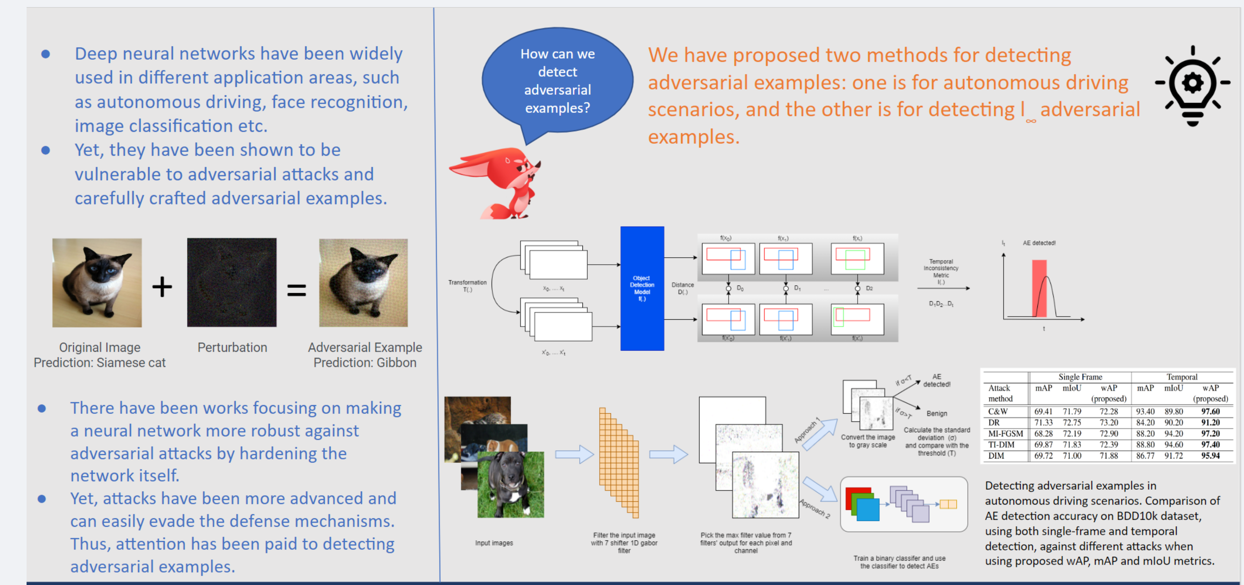


Vision-based Gait Recognition

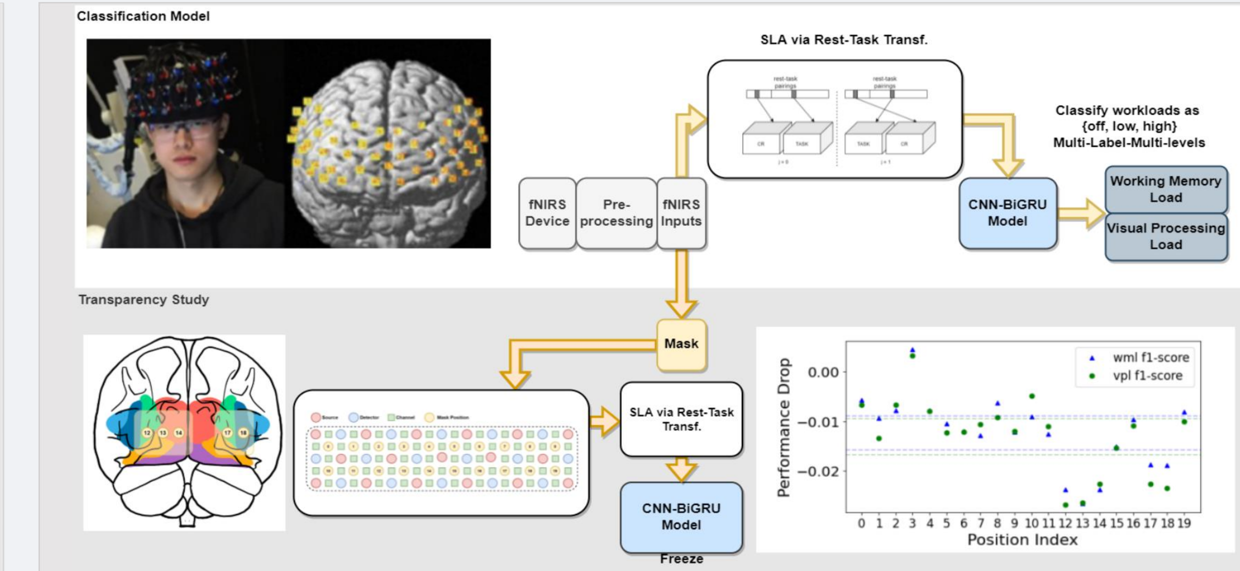


EgoViT: Pyramid Video Transformer with Dynamic Class Token for Egocentric Action Recognition

Current Research Cont'd



Adversarial Example Detection



Cognitive Workload Classification

Projects

- MicroCam: A Low Power and Privacy Preserving Multi-Modal Platform for Occupancy Detection, in partnership with SRI International, sponsored by Advanced Research Projects Agency-Energy (ARPA-E), U.S. Department of Energy and NYSERDA
- Aerial Intelligence for Retrofit Building Energy Modeling (AirBEM), in partnership with Georgia Tech and MIT, sponsored by Department of Energy - Buildings Energy Efficiency Frontiers & Innovation Technologies (BENEFIT)
- Deep Insight - Deep-Net Driven Approach to Estimate Driver State in Naturalistic Data, in partnership with Iowa State, sponsored by the Department of Transportation
- Improved Cross-Subject Cognitive and Emotional State Classification Using Functional Near-Infrared Spectroscopy Data for Deep Learning, sponsored by National Science Foundation

Major Contributions/Output

- MicroCam prototype for HVAC control and surveillance
- Patent: S. Velipasalar, A. Almagambetov, M. Casares, "**Automatic Detection by a Wearable Camera**," 9,571,723, issued on February 14,2017
- Edited Books:

- Selected publications at https://ecs.syr.edu/faculty/velipasalar/publications_velipasalar.html

Team Members

Dr. Senem Velipasalar, Professor
Ms. Chenbin Pan, Ph.D. candidate (Sep. 2019 to present)
Mr. Jiyang Wang, Ph.D. candidate (Sep. 2019 to present)
Mr. Weiheng Chai, Ph.D. candidate (Sep. 2020 to present)
Mr. Jiajing Chen, Ph.D. candidate (Sep. 2020 to present)
Ms. Minmin Yang, Ph.D. student (Sep. 2021 to present)
Ms. Huantao Ren, Ph.D. student (Sep. 2022 to present)

Sponsors

- Advanced Research Projects Agency-Energy (ARPA-E), U.S. Department of Energy
- New York State Energy Research & Development Authority (NYSERDA)
- U.S. Department of Energy
- U.S. Department of Transportation
- National Science Foundation
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